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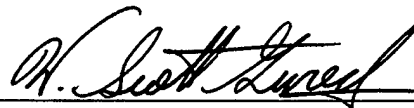
Network Centric Warfare and Complex Humanitarian Emergencies, Meet Napster!

by

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

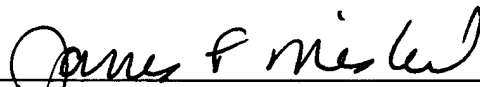
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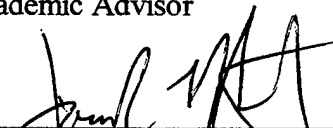
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Preface

My interest in this topic arose from my study of the principles of network-centric warfare (NCW) at the Naval War College. Having just completed an elective on the subject of disaster preparedness and complex humanitarian emergencies, I found it curious that while the latter will continue to be a sure-bet mission for the U.S. military, no one has yet proposed a way to extend the joint force commander's (JFC) NCW-based information umbrella to include the many private voluntary organizations (PVOs) and non-governmental organizations (NGOs) with which he will need to coordinate.

My purpose, then, is to expand the literature on NCW so that it includes a recommendation about how to make any member of any humanitarian relief organization (HRO) a *node* on the JFC's information grid, and in so doing improve the overall effectiveness of some future JFC who finds himself involved in a complex humanitarian emergency.

Abbreviations

CA	civil affairs
CARE	Cooperative for Assistance and Relief Everywhere
CMOC	civil-military operations center
COTS	commercial off-the-shelf
DART	Disaster Assistance Response Team (USAID/OFDA)
DoD	Department of Defense
DoS	Department of State
ESG	Executive Steering Group
FEMA	Federal Emergency Management Agency
GPS	Global Positioning System
HACC	humanitarian assistance coordination center
HROs	humanitarian relief organizations
JFC	joint force commander
JTF	joint task force
LAN	local area network
LNOs	liaison officers
MOOTW	military operations other than war
NCW	network-centric warfare
NGOs	non-governmental organizations
OCHA	Office for the Coordination of Humanitarian Affairs
OFDA	Office of Foreign Disaster Assistance
PC	personal computer

PVOs	private voluntary organizations
P2P	peer-to-peer
UN	United Nations
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
UNMIK	United Nations Mission in Kosovo
USAID	U.S. Agency for International Development
USG	United States Government

Abstract

Complex humanitarian emergencies have become a permanent feature of the world's security environment, and the U.S. military will continue to be involved in them. At the "pointy end" of any U.S.-led response will be a joint force commander (JFC), and complicating his job will be the requirement that he consult and coordinate with the numerous humanitarian relief organizations (HROs) which he neither commands, nor controls, but which will most certainly populate any such humanitarian emergency.

Unfortunately, advocates of one of the military's newest initiatives - network-centric warfare (NCW), which seeks to adopt the business concept of "netcentricity," have yet to articulate a way to bring these HROs under the military's shared information umbrella when doing so would benefit everyone involved.

This essay addresses that shortcoming, and provides a solution based upon the technology and business model behind the popular music file sharing utility "Napster." It will show how a Napster-like software application developed, and then freely distributed, by the Department of Defense (DoD), would allow any member of any HRO who possesses a personal computer and access to the Internet, to become a *node* on the Joint Force Commander's (JFC) shared information grid.

Introduction

There is widespread agreement that complex humanitarian emergencies have become a permanent feature of the world's security environment, and that for both political and practical reasons, the U.S. military will remain the president's tool of choice when dealing with them.¹

At the "pointy end" of any U.S.-led response will be a joint force commander (JFC),² and complicating his job will be the requirement that he consult and coordinate with the numerous humanitarian relief organizations (HROs),³ which he neither commands, nor controls, but which will most certainly populate any such humanitarian emergency.⁴ Among other things, a climate of cooperation will help all sides focus on what they do best. For the HROs, this will include obtaining supplies and local information, selecting delivery areas,

¹ On p. 109 of his book, *U.S. Foreign Policy and the Four Horsemen of the Apocalypse: Humanitarian Relief in Complex Emergencies*, Andrew S. Natsios writes that: "The public advocacy value to the president of the mobilization of the military is unmatched: in one single presidential act, the entire national news media of the United States and much of the rest of the world focuses its attention on the complex emergency to which the mobilization is directed. When the president orders U.S. soldiers to an emergency, they carry the U.S. flag and wear a distinctive uniform, something humanitarian organizations do not do; the flag is visual evidence of U.S. leadership, which in many cases presidents want to underscore."

² *Joint Pub 1-02* defines a JFC as: "A general term applied to a combatant commander, subunified commander, or a joint task force commander authorized to exercise combatant command (command authority) or operational control over a joint force."

³ Hereafter, the use of "HROs" is meant to include all groups who have an interest in providing assistance during complex humanitarian emergencies. These include, but are not necessarily limited to, private voluntary organizations (PVOs), non-governmental organizations (NGOs), regional and international organizations, U.S. Government agencies such as the U.S. Agency for International Development (USAID) Office of Foreign Disaster Assistance (OFDA), and the United Nations High Commissioner for Refugees (UNHCR).

⁴ An excellent overview of U.S. Government (USG), UN, and other international organizations likely to be encountered by the JFC is listed in Appendix B of *Peace Operations*, U.S. Army Field Manual 100-23.

and interacting with the local populace.⁵ For the military, the focus will be primarily on logistics, communications, and security.⁶

Unfortunately, while support of a complex humanitarian emergency is a sure-bet mission for the U.S. military, the available literature on one of its newest initiatives – network-centric warfare (NCW) – has yet to suggest a way for it to include HROs into the military's shared information umbrella, when doing so would boost the transparency of everyone's actions.⁷ This is because, as it is currently envisioned,⁸ NCW is meant primarily to enhance offensive military capabilities.

This essay addresses that shortcoming, and provides an innovative solution. It will show how the technology and business model behind a simple and popular software program – “Napster” – could integrate every group, not just the U.S. military, into a common, shared information network. A Napster-like software application, freely distributed by the Department of Defense (DoD), could make any computer with an Internet connection, a *node* on a shared information grid. This, of course, would benefit not only the JFC, but also any member of any organization who has an interest in fostering better interagency coordination during the chaos of a complex humanitarian emergency.

⁵ Paul A. McCarthy, *Operation Sea Angel: A Case Study*, MR-374-A, (Santa Monica, CA: Rand, 1994), 24.

⁶ Joint Chiefs of Staff, *Interagency Coordination During Joint Operations, Volume I*, Joint Pub 3-08 (Washington, DC: 9 October 1996), II-20.

⁷ Thomas P. M. Barnett, “The Seven Deadly Sins of Network-Centric Warfare,” U.S. Naval Institute *Proceedings* (January 1999): 37.

⁸ The concept of NCW envisions three *grids* (or networks) – the sensor, the shooter, and the warfighter grids – linked together to provide a comprehensive shared awareness. This shared awareness through many geographically dispersed nodes will give friendly forces information superiority, and will facilitate rapid decision making to the detriment of the enemy. It should be noted that NCW is simply the military term for what is essentially the business concept of “network centrality” (or simply netcentricity) – the ability to distribute information instantly, anywhere in the world, over a digital network.

The importance of coordination

A common feature of complex humanitarian emergencies is the involvement of a broad range of agencies, particularly NGOs and PVOs, who often precede the arrival of the U.S. military. The nature of their business means they are often on scene long before, and frequently long after, the arrival of military forces, especially when long-term problems precipitate the complex humanitarian emergency. These groups are independent, diverse, flexible, and are often the primary relief providers.⁹ They are the ones who manage the health clinics, the feeding centers, and the truck convoys that deliver the food before, during, and after a crisis.¹⁰

Each organization brings its own culture, philosophy, goals, practices and skills to the crisis, and the challenge becomes finding a way to synchronize everyone's efforts.

Of the various coordination tools the JFC has at his disposal, the most effective are those that provide an opportunity for all sides to be heard.¹¹ These include the establishment of an Executive Steering Group (ESG),¹² a civil-military operations center (CMOC),¹³ a humanitarian assistance coordination center (HACC),¹⁴ and the use of liaison officers (LNOs).¹⁵

⁹ Joint Pub 3-08, II-18.

¹⁰ Natsios, 56.

¹¹ Joint Pub 3-08, III-15.

¹² According to Joint Pub 3-08 (chapter III, 15-6), the ESG may be composed of the principals from the JTF, the embassy, NGOs and PVOs, and other organizations as appropriate. The ESG plays a policy role, and it is charged with interpreting and coordinating theater aspects of strategic policy.

¹³ *Joint Pub 1-02* defines a *civil-military operations center* as: "An ad hoc organization, normally established by the geographic combatant commander or subordinate joint force commander, to assist in the coordination of activities of engaged military forces, and other USG agencies, non-governmental organizations, private voluntary organizations, and regional and international organizations. There is no established structure, and its size and composition are situation dependent."

Because cooperation is so important, even when military instruments are absent, civilian relief providers have devised their own ways to coordinate their efforts. For example, the American Red Cross, the Cooperative for Assistance and Relief Everywhere (CARE), the Christian Children's Fund, and at least 22 other NGOs have attempted to improve NGO-NGO, NGO-military, and NGO-UN relations through the adoption of a "Field Cooperation Protocol,"¹⁶ which is basically a list of issues about which they have agreed to try and achieve consensus during disaster assistance efforts. The formation of a Disaster Assistance Response Team (DART) by USAID's OFDA is a U.S. government agency initiative to accomplish the same thing.¹⁷

Other less formal efforts by CARE, World Vision and Catholic Relief Services to improve cooperation between military and non-military actors in complex contingency situations include the hiring of former military officers for senior positions within their organizations.¹⁸ Even a special humanitarian relief exercise, complete with refugee-actors and a mock UN camp, was conducted recently between the U.S. Navy, several Pacific rim

¹⁴ A HACC was established during Operation Uphold Democracy in Haiti for the purpose of maintaining a liaison with NGOs and PVOs. It provided them with operational and logistics information, and received and prioritized their requests for assistance. For more information, see Nancy C. Henderson, "Civil Affairs and Logistics in Haiti." <<http://www.almc.army.mil/alog/mayjun/ms922.htm>> [11 December 2000].

¹⁵ According to Joint Pub 3-08 (chapter III, 19-20), commanders should designate liaison officers (LNOs) to serve as the focal point for communication with external agencies and the host-nation government. Their job is to centralize direction and staff cognizance over planning, coordination, and operations with external agencies or forces.

¹⁶ "NGO Field Cooperation Protocol." 28 September 1996. <<http://www.interaction.org/disaster/protocol.html>> [14 December 2000].

¹⁷ According to the USAID *Field Operations Guide (Version 3.0)*, <http://www.usaid.gov/ofda/fog/FOG_v3_ch4.html>, "DARTs coordinate their activities with the affected country, private voluntary organizations (PVOs), non-governmental organizations (NGOs), international organizations (IOs), and UN relief agencies and other assisting countries. When U.S. military assets are involved with the disaster response, the DART will work closely with those assets to ensure a coordinated effort by USG resources."

¹⁸ Stephanie L. Wright, "The NGO/Military Relationship and Complex Contingencies: A Tool Review," (Unpublished Research Paper, Naval War College, Newport, RI: 2000), 20.

countries, and a range of civilian relief agencies interested in practicing better cooperation and coordination.¹⁹

The available literature on complex humanitarian emergencies has covered both the effectiveness, and the shortcomings, of these and other coordination mechanisms in great detail, and a more detailed analysis of these mechanisms is beyond the scope of this essay. The point is that coordination tools are both desired, and necessary, and that as civilians and soldiers alike find themselves in an increasingly networked world, a high-tech, network-based coordination tool would benefit everyone concerned, including the JFC and the military forces he commands.

A networked world

While it may seem hard to remember today, it was less than a decade ago that we actually performed our jobs without the benefit of e-mail or the web. In fact, it was not until the mid to late '90s that most of us expected the personal computer (PC) on our desk to be part of a local area network (LAN). Today, we expect not only a LAN, but a continuous connection to the Internet as well. When we are away from the office, many of us will stay in touch using a mobile phone, a notebook PC, or both. Connectivity, and increasingly, networked connectivity, has become both a necessity, and a way of life.

This desire to stay connected extends to our private lives as well. At home, the majority of us have at least one PC complete with Internet access and personal e-mail

¹⁹ The exercise, Strong Angel 2000, was conducted 6-19 June 2000 on the Big Island of Hawaii, and included participants from the U.S. Navy, Marine Corps, Army, Air National Guard, UN Office for the Coordination of Humanitarian Affairs (OCHA), the UNHCR, the World Food Programme (WFP), the United Nations Children's Fund (UNICEF), Australian and Canadian armed forces, and the American Red Cross. For more information, see American Red Cross, West Hawaii Branch – Disaster Services, *Strong Angel*, <<http://www.kamuela.com/strongangel/>> [11 December 2000].

accounts. Many families with more than one PC have set up their own home networks. Several large companies, including Ericsson, IBM, Intel, Nokia and Toshiba are working on Bluetooth – “a short-range radio technology aimed at simplifying communications among Net devices and between devices and the Internet.”²⁰ As a de facto standard for wireless technology, Bluetooth will facilitate both rapid ad hoc connections, and automatic unconscious connections between devices. By eliminating multiple cable connections, users will be able to think about what they are working on, rather than how to make their technology work.²¹

Because of the widespread availability of mobile communications devices, and because of constantly shrinking PCs (both in size and cost), the opportunity for anyone to connect to the Internet, primarily for the purpose of accessing the web or e-mail, will steadily increase, regardless of where in the world they might find themselves. To be sure, there are many places in the world today without cellular phone service or ready access to the Internet. But this number shrinks daily. Ten years ago, few of us had ever used a cellular phone. Fewer still could afford the luxury of ownership. Today, on the other hand, we routinely see high quality digital phones and service plans at very reasonable prices, and you can use these phones from coast to coast. What a difference a decade makes!

Every facet of our lives is being touched by netcentricity, which allows for vast global connectivity, real-time collaboration, and rapid and convenient information

²⁰ “Bluetooth.” *Webopedia Definition and Links*. <Webopedia.internet.com/TERM/b/Bluetooth.html> [9 December 2000].

²¹ “FAQ.” *The Official Bluetooth Website*. <<http://www.bluetooth.com/bluetoothguide/faq/1.asp>> [9 December 2000].

exchange.²² Netcentricity has produced a significant byproduct as well - reduced costs. Moving information is far less costly than moving people and things,²³ and as a rule, netcentric businesses, such as Microsoft and AOL, have less "mass" than traditional pre-net ones such as GE, GM, or AT&T, while enjoying similar levels of market capitalization.²⁴

Netcentricity has also allowed companies to downsize while simultaneously increasing productivity. For example, FedEx's PowerShip customer tracking software boosted both customer volume and satisfaction while allowing for an 80-percent reduction in customer service representatives.²⁵

For the military, the promise of being able to mass effects rather than forces, to leave people and machines where they are, and to create smaller, in-theater footprints, are just a few of the benefits to be derived from its version of netcentricity - NCW.²⁶

NCW is a term developed to describe how the military will organize and fight in the Information Age.²⁷ By networking sensors, decision makers, and shooters, a shared awareness is created, which enables faster decision-making, higher tempo operations, greater lethality, increased survivability, and self-synchronization.²⁸ And because NCW promises a better distribution of resources to tasks than was possible in the past, operations, which may

²² University of Maryland, Robert H. Smith School of Business, *Harnessing the Power of Netcentricity*, (College Park, MD: 1999), 2.

²³ David S. Alberts, John J. Garstka, and Frederick P. Stein, *Network Centric Warfare: Developing and Leveraging Information Superiority, 2nd Edition (Revised)* (CCRP, 1999), 62.

²⁴ University of Maryland, 28-9.

²⁵ Ibid, 29.

²⁶ Alberts, Garstka, and Stein, 62.

²⁷ Ibid, 2.

²⁸ Ibid.

have been impossible under a 'traditional' warfare model, might become feasible in the future.²⁹

But this focus on warfighting seems to ignore the possibilities NCW might have during military operations other than war (MOOTW)³⁰, especially complex humanitarian emergencies. Indeed, some have suggested that to better prepare itself for the future, the military might focus NCW on crisis prevention and termination, and accept the fact that external information-technology networking is more important than internal networking, and that the generation and reconstitution of networks might be more beneficial than taking them down.³¹

The question, then, is why not augment traditional, low-tech coordination tools such as the CMOC or LNOs, with a high-tech tool that extends the benefits of NCW to the many PVOs and NGOs who wage war against hunger and disease every day? As one of the U.S. government's principal mechanisms for assisting people at risk in complex emergencies,³² there should be a way to incorporate them into the military's NCW architecture. Indeed, I believe there is a way, and it can be found in the technology and business model behind Napster.

²⁹ Joseph W. Caneva, "Network-Centric Warfare: Implications for Applying the Principles of War," (Unpublished Research Paper, U.S. Naval War College, Newport, RI: 1999), 3.

³⁰ According to *Joint Pub 3-07*, MOOTW focuses on deterring war, resolving conflict, promoting peace, and supporting civil authorities. It may involve both combat and noncombat operations. One such example is providing assistance during a complex humanitarian emergency.

³¹ Thomas P.M. Barnett, "Life After DoDth or: How the Evernet Changes Everything," [sic] U.S. Naval Institute *Proceedings* (May 2000): 53.

³² Natsios, 57.

What is Napster?

Anyone over 34 is likely to answer the question "What is Napster?" with either, "I have no idea," or, "I've heard of it, but I've never used it." This is because 35 percent of Napster's users fall in the 15- to 24-year-old age group, while another 28 percent of Napster's users are in the 25- to 34-year-old group.³³ In other words, while demographics make it unlikely the typical JFC or advocate of NCW has had any first-hand experience with Napster, his teenage children probably have.

A reporter recently wrote that Napster epitomizes the use of peer-to-peer (P2P) networking in a way no other software application begins to match. He goes on to suggest that often it takes a youngster, like Napster's inventor Shawn Fanning, who has no preconceived ideas about how the Internet should work, to harness its distributed power so effectively.³⁴

Napster users share one goal: to locate and download CD audio tracks that have been compressed into the popular MP3 file format.³⁵ So keen are they to do this, that Napster's owners have estimated that even without marketing, its network is growing by more than 200 percent per month, that approximately 10,000 music files are shared per second using

³³ Tom Mainelli. "CNN.com - Technology." *Traffic surges at Napster despite controversy*. 18 July 2000. <<http://www.cnn.com/2000/TECH/computing/07/18/napster.boom.idg/>> [19 December 2000].

³⁴ "Internet.com's Electronic Commerce Guide - EC Outlook." *What Can P2P Do for B2B?* <http://ecommerce.internet.com/outlook/article/0,1467,7761_486031,00.html> [14 December 2000].

³⁵ MP3 files are typically acquired in one of two ways. One is to download audio files that have already been converted into MP3 format by either visiting a web site offering such files, or by using the Napster service. The other is to obtain these files is to create them directly from an audio CD using "ripping" software, which compresses the large audio tracks into much smaller MP3 files that are more easily stored and transmitted across the Internet.

Napster, and that every second more than 100 users connect to the system.³⁶ Quadrupling its user base between February and July 2000, it became the fastest growing software application ever tracked by a research company.³⁷ Napster's popularity may be directly attributed to how seamlessly and easily it allows users to exchange data (in this case MP3 format data files) that is otherwise difficult to obtain.

The Napster service consists of a free, client-side software application that users download from the Napster web site.³⁸ Less than two megabytes in size, installation and setup are quick and easy, and no additional hardware is required.

Napster's popularity comes from its ability to take the frustration out of locating servers with MP3 files.³⁹ It does this by eliminating the need for their servers to do anything other than to keep track of MP3 files located on *client* computers.⁴⁰ As a client-side data discovery software application, Napster provides a way to perform searches of a server-side

³⁶ "CNET News.com." *A&M Records, Inc. v. Napster, Inc.*, No. C 99-5183 (MHP), 2000 U.S. Dist. (N.D. Cal. Aug. 10, 2000). <http://www.canada.cnet.com/News/Pages/Special/Napster/napster_patel.html> [14 December 2000].

³⁷ John Gerald. "vnunet.com." *Napster quadruples user base*. 17 September 2000. <<http://www.vnunet.com/News/1110658>> [19 December 2000].

³⁸ The Napster web site is located at: <www.napster.com>. Two versions of the Napster software are currently available: Napster For Windows and Napster for the Mac. Because it has met its goal of establishing a large user base, and because of ongoing legal challenges, Napster recently entered into a business agreement with Bertelsmann Music Group (BMG) both as a way to finally generate income, and to protect itself from further litigation. The software and business model described here are based upon the free service being offered as of the date of this writing.

³⁹ Since the majority of MP3 files are created from copyrighted recordings, posting them on a server makes the server owner liable for charges of illegal distribution and piracy of copyrighted works. Consequently, few reputable web-hosting services will permit them to be posted on their servers. The sites that do offer copyrighted MP3 files are therefore both illegal and often short-lived.

⁴⁰ Napster users decide what content to make available to others, and the license agreement clearly states that it is the user's responsibility to comply with all applicable federal and state laws applicable to such content, including copyright laws. This, of course, is how Napster has survived its many legal battles to date. While it is widely accepted that the service is being used to illegally distribute copyrighted works, it is the users who are guilty of using it for that purpose, not the owners of the Napster service.

database made up of information about the MP3 files held on *all* online client computers. Once a user finds an MP3 file he wants, the software makes setting up the necessary client-to-client, P2P transfer of the desired file as simple as a mouse click. With little more than the installed Napster software and an Internet connection, any PC can become a *node* on the Napster network.

The value of the Napster network, therefore, grows as the quantity and quality of available music increases. Nodes allow for interaction, with the value of most networks being based upon the number of potential interactions that can take place between nodes (N) - the general formula being N^2 for most networks.⁴¹ In other words, a network with three nodes has the potential for nine information interactions ($3^2 = 9$), while a network with 10 nodes offers the potential for 100 interactions ($10^2 = 100$).

In the case of the Napster business model, by creating a software application that is simple to use, platform-independent, easy to install and, most importantly, makes P2P connectivity automatic, they routinely have 10,000 or more users (i.e. nodes) online at any given moment,⁴² creating some 100 million potential information interactions between them ($10,000^2 = 100,000,000$). An astonishing number by any measure, it is possible because its creators have made becoming a node on their network as basic as having a PC with an Internet connection.

For a more detailed explanation of the Napster software in use, please see the attached Appendix.

⁴¹ Alberts, Garstka, and Stein, 254.

⁴² This observation is based upon my own personal experience with the software. See the attached *Appendix* for a more detailed explanation, including illustrations.

The DoD version of Napster

As mentioned above, Napster users share one goal – to acquire MP3 files. To join the Napster network, you need little more than a PC with an Internet connection. Users are as diverse as the population itself, and the majority of file transfers are completely anonymous because knowing *who* has the information you need (in this case a desired MP3 file) is not only unimportant, it is unnecessary. Instead, you need only know *what* it is you want. The client-side software, and the powerful server-side database, does the rest.

This desire to share information, often with people you do not necessarily know, is exactly what faces the joint military forces and the many HROs involved in a complex humanitarian emergency. As discussed previously, all sorts of coordination tools must be set up by these groups, with many of them involving face-to-face interactions.

But what if this coordination could be done via PC networking? Why not harness the Napster technology and business model in a way that extends the power of netcentricity – and thus NCW – to the benefit of everyone involved?

The solution is for DoD to create a Napster-like software application, and to maintain Napster-like servers, for the express purpose of coordination between groups who typically become involved in complex humanitarian emergencies. The Internet already provides the digital backbone necessary for such a network. What is missing is a common, Napster-like software interface designed with coordination of relief efforts in mind.

Given the sheer number of relief organizations who become involved in a particular emergency, the number of potential information interactions that could take place between users of such an application are staggering. For example, there are some 441 NGOs

registered with the United Nations Mission in Kosovo (UNMIK).⁴³ Assuming each NGO organized themselves around at least three sites or offices,⁴⁴ and that each was using a Napster-like software application to become a node on the coordination network, the possibility exists for more than 1323 (441 x 3) nodes and almost two *million* information interactions⁴⁵ between relief organizations in Kosovo alone.

The precedent for taking the lead on a project that is likely to be used by more civilians than members of the military is the Global Positioning System (GPS). To date, tens of billions of dollars have been invested by DoD in GPS despite the fact that 95% or more of its users are civilians, and several civilian firms do a brisk business building commercial GPS receivers.⁴⁶ DoD has the people and the resources to do it right, and by taking the lead, it could ensure that the software application would complement and integrate seamlessly into other, DoD-only, undoubtedly secure, NCW-based applications.

The software application itself could be made available via a DoD website, just as users download the Napster software from the Napster web site. This ability to easily distribute the software for free to anyone who needs it via web site download is a critical aspect of the business model, and should probably not be changed. It might also be open-source, meaning end-users could modify the software to suit their particular needs as long as functionality between other users remains intact.

⁴³ "UNMIK NGO Registration Database." 20 June 2000. <http://www.reliefweb.int/hcic/ngos/unmik_ngo_registration_database.htm> [1 February 2001].

⁴⁴ Given the fact that one NGO, Catholic Relief Services, employs some 396 staff in 19 separate field offices throughout Eastern Europe and the Caucasus, three sites or offices per HRO is probably on the conservative side. For more information, see "Catholic Relief Services – Where We Work." *Eastern Europe and the Caucasus*. <<http://www.catholicrelief.org/where/easteur.cfm>> [1 February 2001].

⁴⁵ $(441 \times 3)^2 = 1,750,329$.

⁴⁶ LT Gary Scofield, USN, Defense Mapping School Operations, telephone conversation with author, 12 January 2001.

What might have to be modified, in the interest of security, would be the registration procedure. Rather than letting anyone join the network, a means of validating users as having a genuine need to coordinate with other members of the network would certainly be in everyone's interest. This brief validation procedure might be an appropriate task for a current military coordination mechanism, such as the CMOC, or perhaps it could be performed by one of the major civilian relief agencies, such as CARE or the American Red Cross. In any event, the technology exists to apply whatever level of security is needed to ensure only legitimate individuals and groups have access to the coordination network. The point is that to the greatest extent possible, the system should be inclusive rather than exclusive, and the need for human intervention should be minimal.

Like Napster, this software would allow any user to discover information possessed by another user regardless *who* that other user might be, or *where* that user is located. In some cases, the desired information might be files held by another user, such as a digital photo, briefing, or a document relevant to the humanitarian relief effort. In other cases, it may be information about people and supplies, such as being able to find out how many tents, bottles of water, or doctors are available, and where they are located. Perhaps it might help a member of the CMOC find an individual they need to contact. And like Napster, it could provide a "chat" feature, allowing instant voice or written communication between two or more online users.

When Hurricane *Mitch* struck Central America in November 1999, everyone from local church congregations to corporations were eager to donate food and supplies. Some 200,000 pounds of food of various types was collected, including 50,000 pounds of sugar and

30,000 pounds of pasta.⁴⁷ The donated food was then flown to Honduras using space available on military aircraft under the Denton Amendment.⁴⁸

Had a Napster-like coordination tool been available, these congregations could have become nodes on the relief network. As such, they would have quickly and efficiently discovered exactly what types of food or supplies the primary relief providers on the ground in Honduras were requesting, and what needs had already been filled, *before* the first donation was collected back in the States. By collecting only what is actually needed, everyone benefits; the HROs get exactly what they need, and the military optimizes the use of valuable logistics resources.

But perhaps the real power of such an application would come from the way it creates a network-based vehicle for the sharing of information by many disparate, and geographically dispersed individuals. By allowing coordination independent of location, the possibility exists that fewer individuals will need to actually move forward to the crisis location. This would of course save money, and in the case of the military, reduces its "footprint" – a major consideration for any deployment.

It has been suggested that during peace operations, the U.S. could benefit from economies realized through participation in multinational logistics, and that a pool of common-user resources can add to overall efficiency.⁴⁹ A Napster-like software application

⁴⁷ "American Forces Press Service." *Denton Program Moves U.S. Donations by the Ton*. <<http://www.dtic.mil/afps/news/9901142.htm>> [21 November 2000].

⁴⁸ The Denton Amendment is a commodities transportation program that is jointly administered by USAID, the Department of State (DOS), and DOD. It allows for the transport of humanitarian goods on a space available basis using U.S. military transportation. For more information, see: "USAID: Office of Private and Voluntary Cooperation." *Office of PVC – Denton*. <http://www.usaid.gov/hum_response/pvc/denton.html> [1 February 2001].

⁴⁹ "Bosnia-Herzegovina After Action Review Conference Report." <www.fas.org/man/DOD-101/ops/docs/bosrep2a.htm> [11 December 2000].

in the hands of multinational *and* commercial logistics providers, such as UPS or FedEx, might mean that the JFC avoids some logistics coordination headaches altogether because the software could facilitate the matching of a request and an available commercial lift opportunity in ways never before possible.

Another advantage to a network-based mechanism is that coordination could begin early, and need not be dependent upon the actual involvement of the U.S. military. For example, while the typical JFC might not become involved before the situation becomes a complex emergency, this application could be available all the time, allowing HROs to coordinate more efficiently even during periods of relative stability. And because of better pre-crisis coordination, if and when the military does become involved, its footprint might be smaller, and its troops better prepared.

This software application would allow self-synchronization, and would help to make the JFC's contribution and his command responsibility commensurate with his stake in the operation. By leveraging DoD's technological prowess, it could preserve valuable military resources for another day. In other words, not only might this software application better integrate American military power into complex humanitarian emergencies, it would also provide a mechanism for the conservation and maintenance of finite military and civilian resources.

During Operation Uphold Democracy in Haiti, civil affairs (CA) officers received and prioritized requests for logistics assistance and forwarded them for approval and tasking to the CMOC with a goal of providing a response to the customer within 72 hours.⁵⁰ These

⁵⁰ Nancy C. Henderson, "Civil Affairs and Logistics in Haiti." <<http://www.almc.army.mil/alog/mayjun/ms922.htm>> [11 December 2000].

NGO requests, which were often vague and incomplete, included requests for various foodstuffs, vitamins, oil, school supplies, and construction materials. The solution to clarifying the requests was to include a military logistics representative in the daily HACC meeting.⁵¹ This person informally reviewed each request, made sure all necessary information had been provided by the NGO, and based on his knowledge of the military mission, helped CA personnel prioritize the requests.

While this manpower-intensive solution to clarifying and prioritizing requests apparently worked, this is another example where a Napster-like application could improve efficiency. Instead of sending individual requests to the HACC or CMOC, where they must be interpreted and prioritized, much of the coordination could self-synchronize between individuals out in the field, eliminating the need for every request to flow in and out of a central entity.

Such an application would no doubt be beneficial to a future JFC as a preemptive response tool. For example, during a period of increased violence in Zaire and Rwanda in 1996, the Chairman of the Joint Chiefs of Staff issued a directive to the United States European Command to develop a tactical plan to facilitate relief operations and voluntary repatriation of Rwandan refugees.⁵² The intent of the plan was, among other things, to prepare to conduct military operations in support of UN-directed humanitarian assistance and disaster relief operations, to be able to rapidly assess the situation and recommend usage of unique U.S. military capabilities, to complement/supplement designated UN/civilian-led

⁵¹ Ibid.

⁵² Edwin P. Smith, "Joint Task Forces and Preemptive Response," *Joint Force Quarterly*, 20 (Autumn/Winter 1998-99): 92.

agencies, and to minimize the requirement for U.S. military forces.⁵³ In fact, some of the first mission essential tasks identified during the initial planning stages were to identify requirements in support of the humanitarian assistance operations of the UNHCR, NGOs, and PVOs in central Africa, and to establish CMOC interfaces.⁵⁴

After this initial planning, the humanitarian assistance survey team deployed to the area to make an assessment; establish an interface with the U.S. country teams, the government of Rwanda, and relief agencies; and to prepare for follow-on forces.⁵⁵

Had a Napster-like software application been available in this case, perhaps the planners working back in Germany and Italy could have done much of the coordination normally done by a survey team via P2P connectivity, eliminating the need to deploy them in the first place. And even if a team is sent to the crisis area, no doubt it could be smaller, better prepared, or both. Smaller military footprints not only make force protection easier, host nations often express a desire for a limited presence of foreign forces, both in size and duration.⁵⁶

Once the JFC arrives at the scene of a complex humanitarian emergency, considerable effort is spent setting up ways to communicate what is happening on the ground to higher headquarters, relief agencies, the local government, multinational forces, and to the media.⁵⁷ Once again, a common, simple-to-use, platform independent software application

⁵³ Ibid, 93.

⁵⁴ Ibid, 94.

⁵⁵ Ibid, 96.

⁵⁶ Ibid.

⁵⁷ Ibid, 98.

that could make all of these groups nodes on a common network would make the job of coordination easier for everyone involved.

Just as many disparate users of Napster have a common tool to share MP3 files, a Napster-like application could provide a netcentric coordination mechanism that would work independently of actual U.S. military involvement, or the establishment traditional coordination mechanisms.

Web sites, e-mail and other collaborative tools

Because they have become useful to both our personal and professional lives, the obvious question some critics will ask is “Why not just build a web site or use e-mail?” Others will say that the last thing the JFC and members of the CMOC need is another software application to learn, or an “in box” to check, arguing that e-mail and web sites already network everyone together.

ReliefWeb, a web site owned and operated by the UN OCHA, is probably the best online coordination solution to date. Updated around the clock, it provides time-critical access to over 50,000 documents and other information on events as they unfold. Examples include emergency reports, background information, maps, appeals, and contribution tracking.⁵⁸

ReliefWeb provides a valuable service, and there is no doubt it will continue to be a valuable tool for anyone interested in relief efforts around the world. The fact remains, however, that web sites are not node connectors. The authors of a web site can only reach someone willing to seek out what they have to offer.

⁵⁸ “ReliefWeb.” *What we do – and lessons learned*. <<http://www.reliefweb.int/help/whatwedo.html>> [17 December 2000].

The typical web site also tends to be self-promoting. Should a crisis occur today, each of the major HROs and military commands involved, would undoubtedly put information about what they are doing to help the relief effort up on their own, existing web sites. But for the most part, these sites are nothing more than web-based press releases. They are perfect for keeping the media or public informed, but they do little to improve coordination between participants. And as data discovery tools, they are only as good as the last web update, which might be daily for some sites, but days, weeks, or months for others, especially if they lack the manning or resources to update them on a more regular basis.

E-mail also falls short as a true genuine networking solution. While it certainly improves the speed of communications, its unstructured nature inhibits prioritization and positive accounting. This is exacerbated in a crisis when there is a tendency to send everything to everyone on the basis that more information is better than less. The more e-mail one receives, however, the harder it becomes to prioritize those that are meaningful and require action from those that should be discarded. And even junk or unnecessary e-mail must be evaluated before it can be discarded, delaying action on high-priority tasking that sits lower in the queue.

Another problem with e-mail is that the address of the intended recipient must be known. In a normal work environment, where everyone in the command or business is on a LAN, finding people internal to the organization is as simple as going into the system address book. To find someone outside the organization, people typically rely on their personal address books, web pages, telephone calls, etc. But what happens when these same people are deployed to a crisis area, and nobody is at their usual desks? What if a member of the

CMOC would like to send an e-mail to the senior Red Cross representative in a particular location, but has absolutely no idea who that person is, yet alone what their e-mail address is?

Instead of creating a DoD version of Napster, some might argue that coordination could be improved through the use of commercial off-the-shelf (COTS) software. Indeed, the U.S. military is evaluating collaborative planning software such as Microsoft NetMeeting, Information Workspace, and Lotus Notes as tools for the joint warfighter.⁵⁹ Unfortunately, since these programs involve a certain amount of end-user training, as well as licensing costs, it is unlikely that the large and diverse population of HROs would ever embrace one particular application. Napster, on the other hand, enjoys nearly universal appeal among MP3 enthusiasts by virtue of being *free* (for end users at least) and *easy to use* (no training is required). These two characteristics are essential elements of the Napster business model, and they would have to carry over to any version developed for the purpose of sharing information during complex humanitarian emergencies.

The bottom line is that while web pages, e-mail, and COTS products are useful tools, they do not present realistic solutions for creating nodes on a network as it is envisioned under NCW.

Conclusion

Network-centric warfare offers many advantages, but unless a way is found to integrate the many HROs into the joint force commander's shared information grid, better coordination during complex humanitarian emergencies will not be one of them.

⁵⁹ CDR Mark D. Cahill USN, Navy Warfare Development Command, telephone conversation with author, 15 January 2001.

Complex humanitarian emergencies are a fact of life. Because the U.S. military possesses an abundance of precisely those resources that are in the shortest supply when disaster strikes; transportation and logistics, fuel, communications capabilities, commodities, building equipment, medicines, large stockpiles of off-the-shelf provisions;⁶⁰ and because it has the ability to provide security in hostile situations, it will continue to be called upon to provide assistance in ways suited to its unique capabilities.

Since it is the PVOs and NGOs who are often there before, and long after the emergency ends, mechanisms that foster cooperation should not be withdrawn with the withdrawal of military forces.⁶¹ That would be the main advantage of a Napster-like coordination tool. It could begin working long before, and long after, any U.S. military involvement. In fact, under ideal conditions, it would facilitate HRO coordination efforts so effectively that other than to provide the software and run the servers behind it, the military would not have to become involved.

While the scope and purpose of this paper has been to show how this tool might help a JFC during complex humanitarian emergencies, it need not be limited to this use alone. In fact, the owners of Napster, trying desperately to defend their service against music industry attempts to shut them down, have argued that its technology might be used for collaborative working relationships in business, education, and research.⁶² Indeed, at least one researcher

⁶⁰ Thomas G. Weiss, *Military-Civilian Interactions: Intervening in Humanitarian Crises*. (Lanham, MD: Rowman & Littlefield Publishers, Inc. 1999), 17.

⁶¹ Paul Duff, "The CMOC: One Stop Shopping for Humanitarian Assistance Coordination in Peace Operations," (Unpublished Research Paper, Army Command and General Staff College, Fort Leavenworth, KS: 1998), 37.

⁶² "CNET News.com."

working on the Human Genome Project is investigating ways to use Napster-type technology to allow scientists to share their discoveries of the genome.⁶³

A Napster-like software application that would help DoD coordinate with HROs might easily do the same thing for the Federal Emergency Management Agency (FEMA) during domestic emergencies, perhaps without any modification.

It is also possible that an even more powerful, yet simple, networking application exists, but lacks widespread visibility. For example, the “Gnutella” project was recently shut down as quickly as it was launched because it posed an even greater threat to the recording industry than Napster. Rather than relying on a centralized server system to maintain a database of available client-side MP3 files, it would have made user PCs both clients *and* servers, creating a self-perpetuating chain of networked computers that authorities feared they would never be able to stop.⁶⁴ While this might scare music executives, this type of technology might be perfect as a coordination tool during complex humanitarian emergencies.

The Napster software and business model proves, with efficiency and style, that as long as they share a common goal, it is possible to network thousands of dissimilar people with tools and technology that readily exist today. A similar tool, tailored for coordination during complex humanitarian emergencies, would shorten deployments, while simultaneously reducing the size of military footprints – tangible benefits any JFC can appreciate.

⁶³ Kristen Philipkoski. “Gene Research, Meet Napster.” *Wired News*. 5 April 2000. <<http://www.wired.com/news/print/0,1294,35404,00.html>> [14 December 2000].

⁶⁴ Christopher Jones. “Open-Source ‘Napster’ Shut Down.” *Wired News*. 15 March 2000. <<http://www.wired.com/news/technology/0,1282,34978,00.html>> [14 December 2000].

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Appendix

Using the Napster software

Installation and setup of the Napster software¹ could not be simpler, with an interested party being able to download, install, register, and begin sharing and downloading MP3 music files in a matter of minutes. The only personal information a user must supply is a username, password, and e-mail address.

You must be connected to the Internet when you launch the Napster program. When you do, the software logs you into the Napster system, whereupon it performs a quick search of the directory where you store your MP3 files. At this point, the server-side database is immediately updated with information about your MP3 files so that others may find and download them. Only valid MP3 files are added to the Napster database. No other files are recognized or shared. Figure 1 shows the “User status” window that confirms I have been successfully logged in, and that I’m now sharing my own MP3 files with other Napster users.

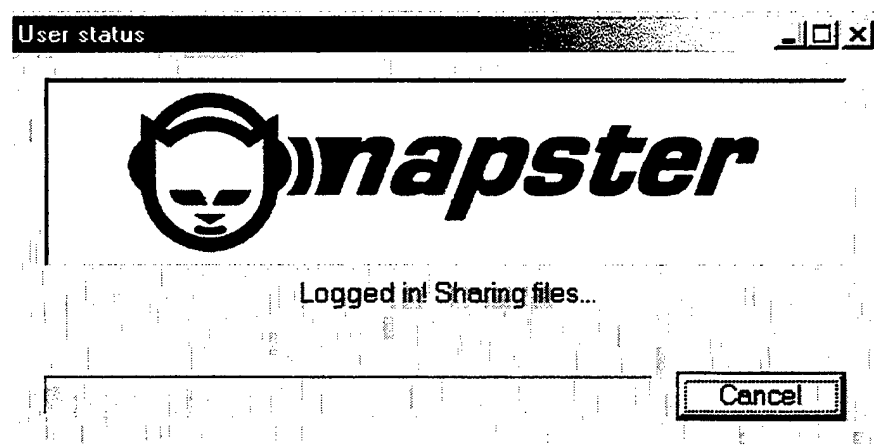


Figure 1. The Napster “User status” window confirming a successful login and the sharing of user files.

¹ The Napster web site is located at: <www.napster.com>. This explanation is based upon Napster For Windows (version 2.0 beta 7).

Once logged into the system, most users will gravitate towards the “Search” feature as shown in figure 2. Here, the most common search fields will be either *Artist* or *Title*, which are generally found in most MP3 filenames.² At the bottom of the user interface, you can see that at the moment this screenshot was taken, I was automatically (by virtue of being logged into the Napster service) sharing my own collection of 228 MP3 music files (i.e. making them available to others), and that service-wide, there were 1,615,697 MP3 files available for download in 9,447 user libraries (i.e. other user’s collections). It should be

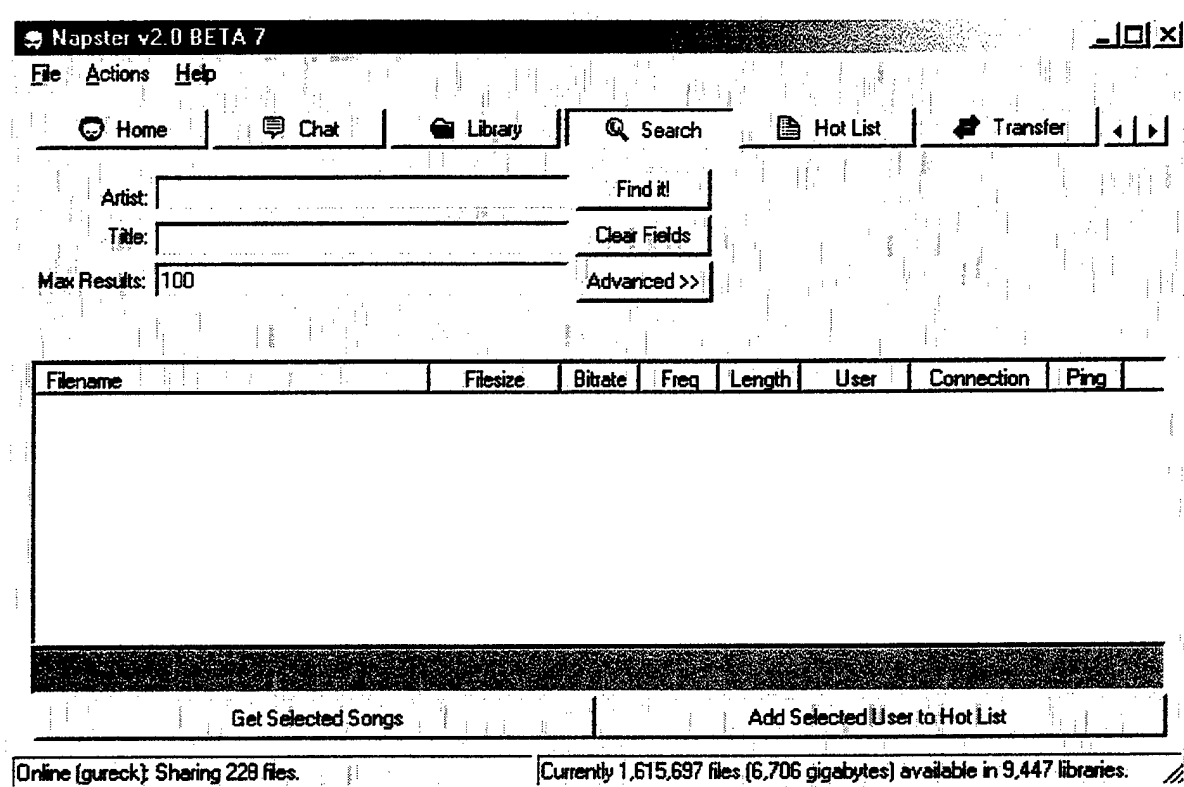


Figure 2. The “Search” feature of Napster as it appears before any search terms have been entered. Note the overall number of files and libraries being shared network wide.

² In other words, a common filename for an MP3 file of the song *Rocket Man* by Elton John would be <Elton John – Rocket Man.mp3>. You can name them anything you want, but most users follow this naming convention for obvious reasons.

noted that these numbers constantly change as users login and logout of the system. That said, at this particular moment, there were 9,447 complete strangers joined together by a common software application and a desire to share a particular type of information.

Figure 3 shows the results of a search of the 1,641,376 files (again, the number available system-wide at that moment) that had a filename that contained the words "Elton John." Search results are returned in seconds, and include the complete filename, file size, bit

The screenshot shows the Napster v2.0 BETA 7 application window. The search bar contains 'Elton John' and the 'Find it!' button is highlighted. The 'Max Results' is set to 500. Below the search bar is a table of search results. The table has columns: Filename, Filesize, Bitrate, Freq, Length, User, Connection, and Ping. The results list various Elton John songs and albums, including 'Don't go br...', 'Candle In The Wind', 'Bad Side of the Moon', 'Benny and the Jets', 'Blessed', 'Born to Lose', 'Can You Feel the Love', 'Candle in the Wind (Part 1)', 'Candle in the Wind (Part 2)', 'Candle in the Wind (Part 3)', and 'Candle in the Wind (Part 4)'. The bottom of the window shows status information: 'Online (gureck): Sharing 228 files.' and 'Currently 1,641,376 files (6,661 gigabytes) available in 10,992 libraries.'

Filename	Filesize	Bitrate	Freq	Length	User	Connection	Ping
Music\Elton John & Kiki Dee - Don't go br...	4,337,998	128	44100	4:30	katrin29	Cable	N/A
Music\Elton John & Tina Turner & Cher - P...	5,781,504	128	44100	5:58	paula23...	Unknown	N/A
elton john\Elton John - (Candle In The Win...	3,847,985	128	44100	4:00	uirhfhirif	56K	N/A
elton john\Elton John - (Candle In The Win...	3,847,985	128	44100	4:00	uirhfhirif	56K	N/A
Reg Strikes Back\Elton John - A Word in ...	4,467,693	128	44100	4:38	kapkrnch	T1	N/A
Elton John\Elton John - Bad Side of the M...	3,133,150	128	44100	3:17	kapkrnch	T1	N/A
Format Compressé\Elton John - Bennie an...	5,169,784	128	44100	5:21	polcabe	56K	N/A
Elton John - Benny and the Jets.mp3	4,976,640	128	44100	5:09	SMDATL	Cable	N/A
Elton John - Blessed.mp3	4,848,744	128	44100	5:01	usu@rio...	56K	N/A
Duets\Elton John - Born to Lose (with Leo...	4,381,176	128	44100	4:33	kapkrnch	T1	N/A
Music\Elton John - Can You Feel the Love...	3,829,760	128	44100	3:59	katrin29	Cable	N/A
Elton John - Can You Feel The Love Tonig...	3,828,348	128	44100	3:59	trex999bc	DSL	N/A
Music\Elton John - Can You Feel The Lov...	3,851,466	128	44100	4:01	sabbu...	Unknown	N/A
Elton John - Can You Feel The Love Tonig...	3,837,314	128	44100	4:00	quoc_t85	28.8	N/A
Elton John\Elton John - Can You Feel the ...	1,673,325	56	44100	3:59	joyful8615	Unknown	N/A
Music\Elton John - Candle In The Wind (1...	3,737,600	128	44100	3:53	Megan...	56K	N/A
Music\Elton John - Candle in the Wind (Pri...	3,974,501	128	44100	4:08	Patbln20	14.4	N/A
Music\Elton John - Candle in the Wind (Pri...	3,973,120	128	44100	4:08	dawg14...	56K	N/A
Music\Elton John - Candle In The Wind (P...	3,800,920	128	44100	3:57	Kmachut	Unknown	N/A
Music\Elton John - Candle in the Wind (Pri...	3,978,088	128	44100	4:08	JamesB...	Cable	N/A

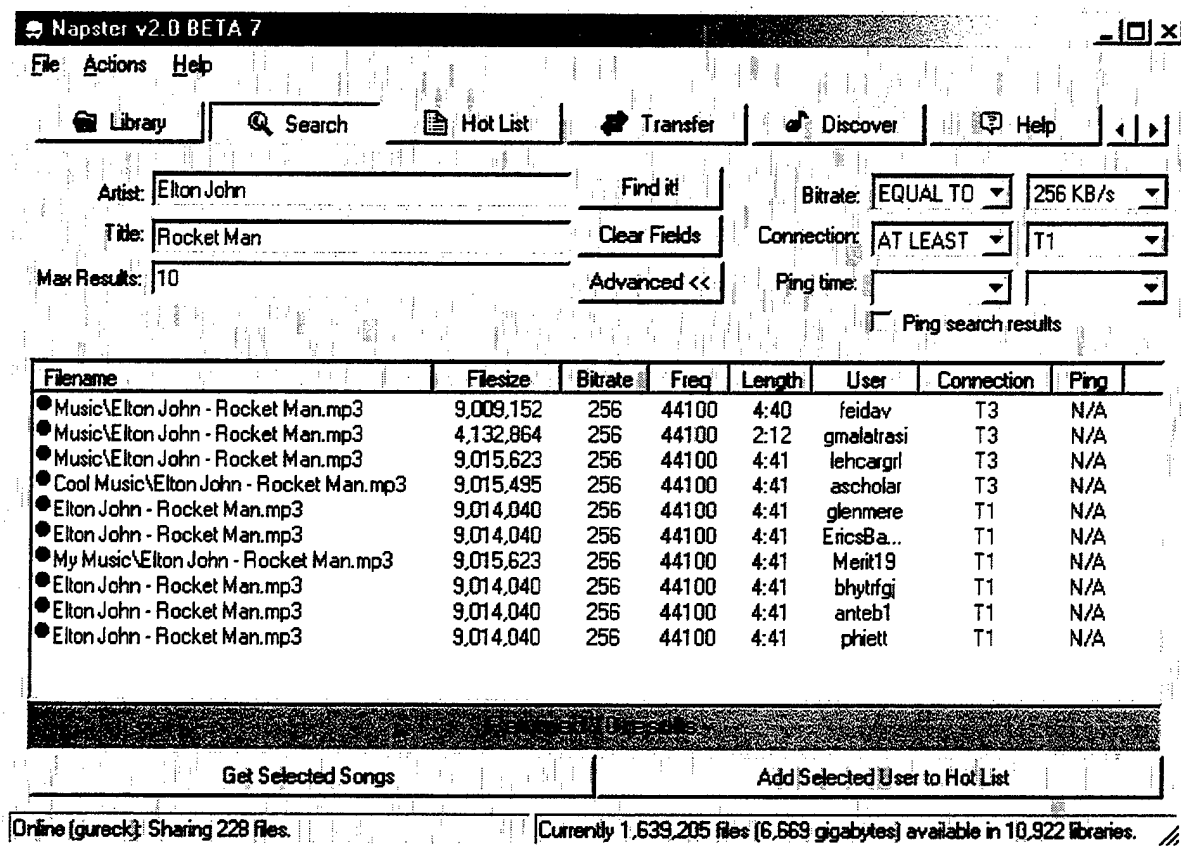
Get Selected Songs Add Selected User to Hot List

Online (gureck): Sharing 228 files. Currently 1,641,376 files (6,661 gigabytes) available in 10,992 libraries.

Figure 3. Search results matching the term "Elton John" in their filename.

rate, frequency, length, user, and the type of connection the user has to the Internet.³ Clicking on the column names (i.e. *Filesize* or *Connection*) will sort the results in numerical or alphabetical order as appropriate against that particular criterion.

Figure 4 shows the same search, only this time I have specified that the filename should also contain the title "Rocket Man." Furthermore, I have selected some features available under the *Advanced* tab. Specifically, I want the results to show only those files



Search Criteria:

- Artist: Elton John
- Title: Rocket Man
- Max Results: 10
- Bitrate: EQUAL TO 256 KB/s
- Connection: AT LEAST T1
- Ping time: [dropdown]
- ☐ Ping search results

Filename	Filesize	Bitrate	Freq	Length	User	Connection	Ping
Music\Elton John - Rocket Man.mp3	9,009,152	256	44100	4:40	feidav	T3	N/A
Music\Elton John - Rocket Man.mp3	4,132,864	256	44100	2:12	gmalafrasi	T3	N/A
Music\Elton John - Rocket Man.mp3	9,015,623	256	44100	4:41	lehcarlri	T3	N/A
Cool Music\Elton John - Rocket Man.mp3	9,015,495	256	44100	4:41	ascholar	T3	N/A
Elton John - Rocket Man.mp3	9,014,040	256	44100	4:41	glenmere	T1	N/A
Elton John - Rocket Man.mp3	9,014,040	256	44100	4:41	EricBa...	T1	N/A
My Music\Elton John - Rocket Man.mp3	9,015,623	256	44100	4:41	Merit19	T1	N/A
Elton John - Rocket Man.mp3	9,014,040	256	44100	4:41	bhytrfgj	T1	N/A
Elton John - Rocket Man.mp3	9,014,040	256	44100	4:41	anteb1	T1	N/A
Elton John - Rocket Man.mp3	9,014,040	256	44100	4:41	phiett	T1	N/A

Get Selected Songs | Add Selected User to Hot List

Online (gureck): Sharing 228 files. | Currently 1,639,205 files (6,669 gigabytes) available in 10,922 libraries.

Figure 4. Search results returned after selecting the *Artist* "Elton John," the song *Title* "Rocket Man," and a *Bitrate* of 256 KB/s, shared by users with at least a *T1 Connection*.

³ The green, yellow, and red dots at the extreme left provide a visual clue about the connection speed, with higher speeds being more reliable when downloading.

recorded at a bit rate of 256 kilobytes per second, and being shared by users with at least a T1 connection to the Internet. I also want to limit the maximum number of results displayed to ten.

In a nutshell, I have found ten client-hosted copies of “Rocket Man” that met my criteria out of the nearly two million MP3 files available network-wide. When each of the ten users above logged into the Napster system, information about each of their MP3 files was automatically added to the Napster database. No manual input was required on their part to provide this information. That information was added to the server-side database that I was subsequently able to search to successfully locate these client-side files.

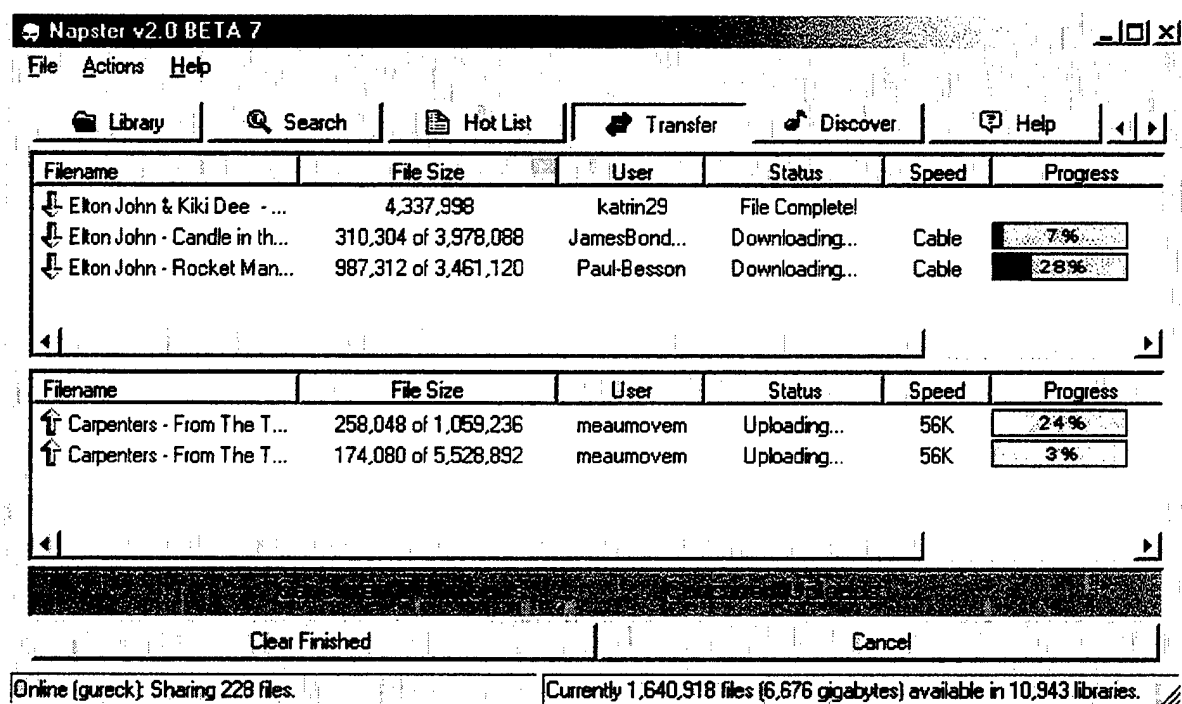


Figure 5. The “Transfer” window showing the status of current uploads and downloads.

Double-clicking on any one of these search results immediately begins a peer-to-peer file transfer, with figure 5 showing the "Transfer" status screen in use.⁴ Here, we see that one song by Elton John, at my request, has already been transferred to me, while two others, including a copy of "Rocket Man," are currently being downloaded to my PC.

As I was downloading the songs above, user "meaumovem," has discovered through his own search of the Napster database that I was online, and that I possessed a couple of songs he desired. Overall, there are two concurrent downloads and two concurrent uploads taking place simultaneously between four total strangers who share nothing in common except similar tastes in music. This demonstrates the powerful and discrete peer-to-peer networking capabilities of this software. Thousands of simultaneous users are able to individually tailor their connectivity with each other based upon their desire to obtain information (in this case, MP3 files) possessed by other users.

⁴ Other tabs provide the user with an opportunity to view his file *Library*, maintain a *Hot List* of users and songs he is particularly interested in, *Discover* new music, and to get *Help* if needed.